

Central Council Tlingit & Haida Indian Tribes of Alaska (CCTHITA)

CCTHITA Tribal Energy Retrofit Project

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Biennial Celebration Event 2010 at Elizabeth Peratrovich Hall (EPH)

Notice: The following is a compilation of an initial insufficient Final Technical Report submitted April 2015, annual PowerPoint presentations given at annual Program Reviews, and quarterly progress reports submitted to the Tribal Energy Program/Office of Indian Energy for agreement DE-EE0005169. The presentations and quarterly reports included herein cover the project activities from September 30, 2011 through June 30, 2016. The report herein has been uploaded to OSTI by the Department of Energy, Office of Indian Energy as a substitute for the required Final Technical Report.

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Executive Summary

The Central Council of the Tlingit and Haida Indian Tribes of Alaska (CCTHITA or Central Council), headquartered in Juneau, Alaska, authorized a Level II energy audit of its Juneau facilities. The Level II audit was completed in August 2010. Through this audit, each tribal building's energy consumption systems were inventoried and evaluated for optimal operation. Data collected included equipment nameplate information, building occupancy schedules, equipment-operating times, and utility bills gathered through on-site visits. From this analysis, a list of potential energy efficiency measures (EEMs) was developed to evaluate each of these measures for cost effectiveness and impact on building operations.

Based on the audit findings, the Central Council set out to retrofit four of these seven audited tribal buildings over a three-year period.



Biennial Celebration Event 2010 at Elizabeth Peratrovich Hall (EPH)

Background

The Central Council Tlingit and Haida Indian Tribes of Alaska (CCTHITA) is a federally recognized tribe representing more than 27,000 Tlingits and Haidas worldwide. The Central Council's beginnings stem from the Jurisdictional Act of 1935 through which it sought recognition for the purpose of pursuing tribal land claims in federal court. Those efforts brought about a settlement and the tribal organization. It is a sovereign entity that has a government-to-government relationship with the United States. The Central Council is a regional government with more than 125 delegates elected by tribal citizens in 21 communities.

The mission of the Central Council is to 'preserve Tlingit and Haida sovereignty, enhance Tlingit and Haida economic and cultural resources, and promote self-sufficiency and self-governance for our citizens through collaboration, service, and advocacy.

Retrofitting tribal buildings to incorporate more energy efficient products, technologies, and systems can significantly reduce energy use and greenhouse gas emissions, and make sound investment sense, as energy savings result in utility cost reduction.

Central Council is partnered with tribes, municipalities and regional organizations in 21 communities in Southeast Alaska to provide a range of socioeconomic services – there are over 50 programs and 200 grants under management. The delivery of these services is crucial because rural communities in Southeast Alaska are distressed and failing.

Rural Tlingit and Haida residents face the challenges of extreme weather and terrain, separation from urban centers and services, limited infrastructure, limited transportation, low incomes and a high cost of living. These have contributed to diminishing populations and local resources. Job opportunities are seasonal and limited and unemployment is high. Populations have been decreasing while the average age is increasing. This means that young people are moving out.

As populations decrease, so do revenues for basic services (locally-generated and government funded). Tribal revenues are also decreasing as funding becomes more competitive. The consequence is that most tribal and city offices are staffed with only a few individuals who are spread very thin. Infrastructure is lacking and/or deteriorating.

Villages have less opportunity and smaller incomes in the face of costs that are 24.9% to 31.9% higher than in the rest of the United States. There is also an extremely heavy reliance on diesel-generated energy, the cost of which has skyrocketed in recent years.

Central Council programs and services are designed to address and mitigate these economic challenges. Reducing the cost of facility maintenance ultimately increases the amount of grant dollars that will go to various social, employment, education, economic, environmental, and transportation services, thus enabling the Central Council to improve its outreach to partner communities.

In April 2008, the Central Council General Assembly declared a tribal crisis and emergency in the southeast region due to the high cost of electrical energy and fuels and the devastating impact on tribal citizens, their communities, their cultural way of life, and their tribal organizations and businesses.

Project Overview

In 2010, the Central Council prioritized the energy audit of its buildings and directed the expeditious implementation of an energy retrofit program to expedite the achievement of energy efficiencies. In this way, the tribe could reduce the costs of energy for buildings housing tribal programs, which would have an immediate benefit, with needed program dollars going further to meet the needs of its constituency.

A Level II energy audit of the Central Council's five tribal buildings was completed in August 2010. However, the available funding from this grant required us to only partially address the recommended retrofits. In review of the recommended Energy Efficiency Measures they were ranked for return on investment and focused on upgrading the fuel oil-fired boilers at four of our facilities and then using the remaining funds to retrofit as much of the exiting lighting at our largest facility. As retrofitting tribal buildings to achieve energy efficiencies continues to be a priority of the tribe, the Central Council has now completed these retrofits under this project.

This retrofit project will operate out of the Office of Tribal Operations (OTO) under the oversight the Chief Operating Officer. Tribal Operations oversees the implementation of Tribal policies, the financial well-being of the Tribe, and relations with outside organizations. As facilities management and maintenance is a responsibility of Tribal Operations, Building Management Dept., the project will operate out of the Tribal Operations Office and be coordinated through the Property Manager in the Building Management Section.

The retrofit/upgrade activities on all four buildings will be contracted out to multiple contractors specializing in their particular field of expertise as related to the phase of the project. The responsibility for internal coordination of the retrofit activities will be assigned to Building Management.



The matrix below details the Energy Efficiency Measures (EEMs) to be installed in the four buildings (updated after Modification 003 which shifts the EEMs to focus on the Hope building):

Energy Efficiency Measure (EEM)	Hope Bldg.	EKT	VTRC	Douglas
Lighting Upgrade to High Efficiency LED Units	74			
<u>Variable Frequency Drives</u> & Prem. Eff. Motors on AHU Supply Fans	2			
New High Eff. Modulating Boilers w/Night Setback	1	1	1	1
CO2 Demand Ventilation Control	1			
Replace existing Emergency Exit Signs	6			
Emergency Battery Back Up System required for Lighting upgrade	1			



Objectives

The retrofit project was initiated to contribute to the Central Council mission to enhance the Tribe's economic and cultural resources, and help achieve the Tribal mandate for facilitating energy efficiency in the Native community. Under this project, the Central Council planned to carry out a three year program for the installation of energy efficiency improvements or retrofits to four (4) Tribal buildings, located in Juneau, Alaska.

Originally, four tribal buildings, those supporting critical socioeconomic programs for tribal citizens and communities, were to be retrofitted:

- The Andrew Hope Building
- The Vocational Training and Resource Center
- The Edward K. Thomas Building
- The Douglass Headstart Building

The following is a brief description of each building.

Andrew Hope Building

The Andrew Hope Building, a 40,873 square foot office building was built in 1983, is located at 320 W. Willoughby Avenue. The building and the land on which it sits are owned in fee simple by the Tribe.

Energy Star Rating – 0	Cost - \$37,421
Total Energy Cost - \$63,484	Electr. Cost/kWh - \$0.09
Total Cost/SqFt - \$1.55	kWh/Sq Ft - 10.69
Total Consum. (kBtu) - 2,612,224	Consum. (kBtu) - 1,489,324
Intensity (kBtu/SqFt) - 63.97	Consum. (Gals) - 11,229
Emissions (CO2/SqFt) - 4.4504	Cost - \$26,063
Demand (kW) – 0	Cost/Gal - \$2.32
Consum. (kWh) - 436,496	Gals/SqFt - 0.27
	Consum. (kBtu) - 1,122,900



Andrew Hope Building

Vocational Training and Resource Center (VTRC)

The Vocational Training and Resource Center, a 9,860 square foot educational facility built in 1998, is located at 3239 Hospital Way. The building and the land on which it sits are owned in fee simple by the Tribe.

Energy Star Rating – 0	Cost - \$13,398
Total Energy Cost - \$30,084	Electr. Cost/kWh - \$0.08
Total Cost/SqFt - \$3.05	kWh/Sq Ft - 16.48
Total Consum. (kBtu) - 1,228,818	Consum. (kBtu) - 554,518
Intensity (kBtu/SqFt) - 124.63	Consum. (Gals) - 6,743
Emissions (CO2/SqFt) - 8.7744	Cost - \$16,686
Demand (kW) - 56	Cost/Gal - \$2.47
Consum. (kWh) - 162,520	Gals/SqFt - 0.68
	Consum. (kBtu) - 674,300



Vocational Training and Resource Center (VTRC)

Edward K. Thomas Building

The Edward K. Thomas Building, an 11,400 square foot office building built in 1982, is located at 9097 Glacier Highway. The building and the land on which it sits are owned in fee simple by the Tribe.

Energy Star Rating – 0	Cost - \$6,808
Total Energy Cost - \$26,580	Electr. Cost/kWh - \$0.08
Total Cost/SqFt - \$2.33	kWh/Sq Ft - 7.57
Total Consum. (kBtu) - 1,070,356	Consum. (kBtu) - 294,456
Intensity (kBtu/SqFt) - 93.89	Consum. (Gals) - 7,759
Emissions (CO2/SqFt) - 6.7263	Cost - \$19,772
Demand (kW) - 0	Cost/Gal - \$2.55
Consum. (kWh) - 86,300	Gals/SqFt - 0.68
	Consum. (kBtu) - 775,900



Edward K. Thomas Building

Douglass Headstart Building

The Douglass Headstart Building, a 3,646 square foot daycare center built in 1962, is located at 201 Cordova Street. The building and the land on which it sits are owned in fee simple by the Tribe.

Month	Gals	Cost	Cost/Gal
June-10	230.0	\$631	\$2.74
March-10	323.0	\$853	\$2.64
January-10	282.7	\$730	\$2.58
December-09	273.7	\$660	\$2.41
November-09	202.3	\$481	\$2.38
September-09	216.4	\$515	\$2.38
May-09	290.8	\$665	\$2.29
	1,818.9		



Douglass Headstart

Description of Activities Performed

The primary efficiency measure identified in our audit was the replacement of our existing heating systems with new energy efficient models. Our first course of action was to secure a contractor to remove our existing boilers and controls to replace with new fuel oil-fired boilers rated at a minimum American Society of Mechanical Engineers (ASME) 86% efficiency rating.

The Tribe prepared bid documents and requested all bidders provide manufacture specifications and schematics for the entire boiler renovation as part of their bid packets. Bidders were also required to demonstrate experience and capacity to perform the work including trade references.

The Tribe received a total of three bids and all were compared as per the criteria. The lowest bidder was a local contractor, Harri Plumbing & Heating. The selected boiler manufacturer was Buderus, G315-7 modular cast iron units utilizing three pass design with ASME rating of 87%.

The contract with Harri Plumbing & Heating was awarded in June of 2013. The boiler units needed to be ordered and shipped to Alaska which meant that actual work did not commence until September. The facilities which were retrofitted with new boilers were; Andrew Hope building, Edward K. Thomas building, Vocational Training & Resource Center and Douglass Head Start. This phase of the project was completed in January of 2014.

Another primary efficiency measure defined by our energy audit was the need to upgrade our lighting. After review of our remaining funds for this project the original scope of work was revisited and the decision was made to devote the balance of the funds to the lighting retrofit.

In August 2013, Central Council suffered a major building structural failure when it was discovered that approximately 1,600 square feet of supporting truss members failed resulting in a collapse of a section of the flooring on the third floor of Central Council's main headquarters - the Andrew Hope Building (AHB). The failure was so severe that the building was determined to be in imminent danger of collapse by the investigating structural engineer. In response, Central Council expended nearly \$30,000 in emergency repairs that provided temporary shoring support underneath the third floor and required engineering services to ensure the structural integrity of the rest of the building.

Upon investigation by three separate engineering firms, it was determined that the most likely cause of the failure was poor engineering in the design of the original truss members. This determination was deemed a "latent defect" and was excluded from coverage by our insurance company.

The same faulty engineering was used on all of the truss members supporting the 3rd floor above the community hall. The project would require replacing over 6,000 square feet of overall office area situated above the Elizabeth Peratrovich Hall. Our engineer has estimated the total repair cost at \$1,300,000.

As a result of the hazard and need to repair, Central Council was forced to relocate 12 staff and four program offices (Child Care, Elderly Services, Employment & Training, and Vocational Rehabilitation and Human Resources) to other areas of the building and to another off-site office location approximately 10 miles away. This fragmentation of our operations led to an interruption in critical services and caused inefficiencies in delivering services to our tribal citizens.

Due to this event, the Tribe was also been unable to rent the Elizabeth Peratrovich Hall to local charitable organizations. This has resulted in an estimated loss of \$3,000 per week in income, since the damage occurred to the building.

The loss of using our community hall was debilitating to our operations and affects our Tribal finances. The revenue generated through hall rentals is wholly earmarked to meet our monthly mortgage, insurance and operations obligations.

The Andrew Hope Building is a common meeting area for our Tribal members. The Elizabeth Peratrovich Hall resides on the first floor of the Andrew Hope Building and is important venue to the Native community that serves as a meeting and event location for Central Council's Tribal Assembly, popular Native Issues Forums with legislators, government meetings and consultation, funerals, memorials, Alaska Native Brotherhood (ANB) and Sisterhood meetings, and various charitable organizations.

Obviously, there was no choice but to immediately begin making the repairs necessary to restore operations.

In planning the Elizabeth Peratrovich Hall renovation the Tribe wanted to take the opportunity to do some energy efficiency upgrades. This included installing additional insulation, reconfiguring the HVAC system and will be upgrading lighting in the hall to LED's. These investments will go far in reducing future energy demands.

The Tribe began restoration and upgrades with an expected project completion date near the end of March, 2014.

As CCTHITA realized that there was not enough funding to retrofit all of the facilities, the focus became the largest facility, the Andrew Hope building which is the main headquarters for the Tribe. The initial look was to possibly simply retrofit the existing T12 fluorescent fixtures to upgrade them to T8. But, after a cost analysis of the parts and labor required, along with the realization that there would still be the original 30 year fixtures and luminaries, the decision was made against this. In looking at the emergence of LED lighting in the facility maintenance industry and seeing that the costs had come down to the point where this could be a serious consideration. In the end, there was a strong belief that the initial investment in LED lighting would produce a significant return in efficiency, reduced operating costs, and reduced maintenance costs and comfort.

In consideration of the high initial costs of implementing LED lighting, the focus of initial efforts regarding where there would be the highest use. In review of daily operating lighting demands, it was decided that the best use of this technology would be at the Elizabeth Peratrovich Hall occupying a portion of the Andrew Hope building. The Elizabeth Peratrovich Hall is a 6,400 square foot community hall which is used to provide trainings, conferences, workshops, recreational activities, as well as hosting our tribal functions. It is a large open space requiring a lot of lighting to operate.

The lighting retrofit project required removing the existing inefficient T-12 lighting and installing new LED lighting panels, cabling and controls. This retrofit is expected to reduce energy use by a minimum of 50%. The Elizabeth Peratrovich Hall was under renovation at this time so it was an opportune time to purchase the units directly and have the contractor install them as part of the remodeling.

The work was completed in February 15, 2015 and was closely monitored regarding both the boiler and lighting retrofits for reductions in energy, as well as carbon emissions, and energy bills. This project is expected to be a catalyst in the energy efficiency of the Tribe and encourage Tribal members and employees alike to join the cause.

Conclusions and Recommendations

As these two retrofits have just recently been online, there is at least a year of observations necessary to truly appreciate their combined effectiveness. There are fuel savings of nearly 30% from the boiler upgrades, with that expected to increase as the operation is fine-tuned.

There are expected reductions of close to 50% in the portion of the electrical used by the Elizabeth Peratrovich Hall. At this point in time, those working on the project, as well as visitors can easily see the improvements in the lighting of the hall.

Lessons Learned

As with any construction project, it is important that plans be malleable as the project progresses and new information is gathered. Attempting to stick to a defined scope, budget and timeline will cause undue stress and possibly overlook some alternate options.

This lesson was learned in reviewing the original project budget and scope of work. The Tribe's original audit was not as thorough and precise as it was originally believed to be. There were assumptions that the work outlined in the audit was specific enough to have contractors provide

competitive pricing. When in reality, there was far more research needed to provide the contractors with what the project objectives were. Adding to this difficulty was the range of building types and sizing we were dealing with, from the 3,500 sf Douglass Headstart, originally built as a church in 1962, to the 41,000 sf Andrew Hope building completed in 1986.